



Paper Type: Research Paper

## Retirement Adjustment Solutions: A Comparative Analysis Using Shannon's Entropy and TOPSIS Techniques

Mahdi Nakhaeinejad<sup>1,\*</sup> , Seyed Mahdi Ebrahimi<sup>1</sup>

<sup>1</sup> Department of Industrial Engineering, Yazd University, Yazd, Iran; m.nakhaeinejad@yazd.ac.ir; s.mahdi.ebrahimi@stu.yazd.ac.ir.

### Citation:

Received: 26 March 2024

Revised: 08 May 2024

Accepted: 19 June 2024

Nakhaeinejad, M., & Ebrahimi, S. M. (2025). Retirement adjustment solutions: A comparative analysis using Shannon's Entropy and TOPSIS techniques. *International journal of research in industrial engineering*, 14(1), 21-41.


### Abstract


Human resources are undoubtedly the most crucial resources of organizations. A significant part of the human resources includes retirees of the organization. Organizations must provide adequate support to acknowledge their years of service to facilitate retirees' adaptation to new circumstances. This study investigates retirement adjustment among personnel of the Yazd Electricity Distribution Company (YEDC). For this purpose, the challenges and problems that discourage people from retiring are identified first. Based on these challenges, retirement adjustment solutions are proposed. The retirement adaptation solutions have been ranked based on three criteria: financial promotion, identity improvement, and interaction improvement, using Shannon's Entropy and TOPSIS techniques. The extraction of factors in two categories of challenges and solutions represents a contribution of this research. Furthermore, this research examines the different views of personnel with varying job levels, work experience, and genders through statistical analysis, which is another contribution of this research. Finally, the results of this research show the ranking of solutions using combined Shannon's Entropy and TOPSIS techniques, which emphasize the novelty of this research.

**Keywords:** Retirement adjustment, Ranking, Challenges, TOPSIS, Shannon's entropy.

## 1 | Introduction

Human resources are one of the most critical assets of organizations. It is the responsibility of organizations to prioritize the well-being of their employees and strive to enhance their quality of life. Retirees, possessing valuable knowledge and experience accumulated over years of service, form a significant segment of the

 Corresponding Author: m.nakhaeinejad@yazd.ac.ir

 <https://doi.org/10.22105/riej.2024.449992.1429>



Licensee System Analytics. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0>).

workforce. In recognition of their contributions, organizations should provide retirees with the necessary support to help them adapt to new conditions during retirement.

Retirement is when the organization terminates the service of the personnel, with the increase in age and years of service, and according to the past services, it determines a fixed pension for him/her. Retirement signifies a significant life change involving opportunities, threats, expectations, desires, and concerns. It is one of the most significant life transitions and a socially accepted phenomenon that involves a crucial process of role change for individuals. Retirement means separation from a long-standing professional role [1]. Consequently, this phase can pose significant challenges to an individual's financial, social, and emotional well-being.

In organizations like Yazd Electric Distribution Company (YEDC), employees who meet retirement criteria often hesitate due to uncertainties about post-retirement circumstances. This paper aims to improve retirement conditions by identifying key indicators for successful adaptation. By effectively identifying and ranking these factors, organizations can improve retirement conditions for their employees.

The research outcomes implemented at YEDC provide solutions enabling retiring employees to adapt more effectively to new post-retirement realities. This study at YEDC, through an extensive literature review, employee survey, statistical analysis, and ranking based on Shannon's Entropy and TOPSIS techniques, provides insights into enhancing retirement adjustment solutions for organizational personnel.

In the subsequent section of this paper, the research background is explored, and the research's stance is established through a literature review. The third section outlines the methodology employed in this study, which involves conducting surveys and statistical analyses at YEDC, utilizing Shannon's Entropy and TOPSIS techniques. The fourth section presents the primary research findings, including analyzing differing perspectives among staff and a ranking of retirement adaptation solutions. Finally, in the fifth section, a summary and results of the research are presented.

## 2 | Literature Review

Retirement represents an inevitable phase in every employee's life, signifying the conclusion of their employment with an organization and the commencement of a new chapter. As such, retirement is a process that requires individuals to embrace changes and adjust to new roles [2]. Various organizations have considered different indicators to facilitate employee retirement. This study examines these indicators in existing literature and surveys YEDC to categorize them as "challenges" and "solutions". Statistical techniques including descriptive statistics, single sample t-test, independent t-test, and ANOVA are used to present findings. Retirement adjustment solutions are ranked using Shannon's Entropy and TOPSIS techniques.

This section offers an overview of prior research on retirement compatibility across various organizations and countries. Through a review of previous studies, this research aims to identify challenges and solutions for retirement adaptation.

Yeung [3] conducted a study in Hong Kong over one year to assess how resources impact retirees' physical health and well-being during their transition to retirement. The study evaluated personal resources, physical and mental satisfaction of participants six months before and after retirement. The findings revealed that retirees experienced decreased financial resources during the six months following retirement. Additionally, changes in physical performance, life satisfaction, mental health, and mental distress were observed during the transition period due to changes in resources. Despite the influence of financial, physical, and social resources on retirees' well-being, psychological resources were crucial for successful adaptation to retirement. Therefore, it is recommended that cognitive, emotional, and motivational aspects be strengthened in retirement planning.

Topa and Pra [4] demonstrated that retirement adjustment quality is influenced by access to valuable resources during transition phases and individual backgrounds. Their study aimed to examine how history, dispositional

characteristics, and motivational variables impact the accumulation of resources among older workers, ultimately affecting the quality of retirement adjustment. The study was conducted on a sample of 455 Spanish workers.

Schmalzle et al. [5] examined retirement's correlation with subjective satisfaction in Germany. Short-term satisfaction was linked to changes in social status, while long-term satisfaction was associated with resources and living conditions changes. Retirees from work did not experience significant short-term life satisfaction changes but reported improved long-term outlooks; those retiring from unemployment or disability initially experienced boosted satisfaction but showed negative long-term trajectories.

Henkens et al. [6] emphasized a significant shift in retirement perspectives due to the aging population, exploring evolving retirement definitions, technology's influence, housing's role, human resource strategies, adaptation to policy changes, the retirement industry, and ethnic diversity impact.

Bonke et al. [7] analyzed the effects of early retirement on behaviour, well-being, pensions, and budgets using German tax and social security data. Disincentives were found to shape retirement behaviour significantly. Additionally, while incentives may be effectively promote early retirement, they can also lead to increased inequality and reduced individual well-being.

Froidevaux et al. [8] studied retirement adjustment influenced by identity transfer processes, highlighting factors like identity mismatch, negotiation of identity transfer, and the diversity of high-quality exchange relationships. Their theoretical model highlights the dynamic nature of identity incongruity over time and the coexistence of work-related identity with retired identity.

Hansson et al. [9] investigated factors affecting life satisfaction during retirement transition among 1924 individuals, noting the impact of self-esteem, autonomy, social support, health, cognitive ability, and financial resources. The results showed that while poor health and lack of initial financial resources can negatively affect life satisfaction in retirees, these effects can be offset by higher levels of independence, social support, and perceived cognitive ability.

Aslim [10] examined how the Affordable Care Act expansion affected retirement decisions for individuals aged 55 to 64 with low education levels. The study's estimates indicate that the expansion has led to an increase in early retirement among women, while the retirement behaviour of men has remained relatively unchanged.

Boissonneault and Beer [11] explored the link between working ability decline and early retirement risk due to unemployment or disability. The results also suggest that workers with low and declining abilities are at greater risk of experiencing unemployment, disability, and inactivity before retirement.

Hansson et al. [12] studied the type of retirement transition and how individual resources interact to influence changes in life satisfaction during retirement. The study assessed several resources crucial for the retirement transition, such as self-esteem, independence, social support, self-rated physical health, self-rated cognitive ability, and basic financial assets. The study's results indicated that the type of retirement transfer and individual differences in resource ability have distinct effects on changes in life satisfaction during the retirement transition.

Zahorcova et al. [13] qualitatively studied Slovak retirees' transition experiences to identify facilitating or hindering factors through the transition process from work to retirement, beneficial factors during the transition, risk factors during the transition, and positive and negative changes during retirement. The authors identified several key factors that contributed to successful retirement adjustment, including engaging in new activities, maintaining social relationships, good health, prior retirement planning, and protective attitudes such as acceptance, gratitude, optimism, and a greater understanding of life. Furthermore, the study highlighted several common risk factors that impeded the transition to retirement, such as bereavement, an extended retirement age, financial constraints, and the illness of a spouse.

Hurtado and Topa [14] studied on the transition to retirement, examining how retirees perceive their gains and losses as they approach retirement and the subsequent impact on their well-being post-retirement. The research involved 244 Spanish workers to investigate the link between pre-retirement preparation behaviours and post-retirement quality of life and health. The study also considered the mediating role of perceived benefits and losses in retirement.

Bairoliya [15] explored the effects of changes in social security policies and annuity-based pension plans on retirement decisions. The study utilized a structural model incorporating retirement, consumption, savings, social security, health insurance, and retirement plan variables.

Hansson et al. [16] delved into the relationship between the big five personality traits and life satisfaction during the retirement transition. Their research analyzed both direct and indirect effects of personality on factors such as self-esteem, autonomy, social support, physical health, cognitive ability, and financial satisfaction. The findings indicated that retirees with higher levels of neuroticism were more susceptible to adjustment difficulties due to negative changes in key resources during this period.

Chen and Li [17] demonstrated that individuals with hyperbolic preferences prefer early retirement based on current preferences but delay retirement due to their initial time preference rate compared to those with exponential preferences. They also discovered that the consumption-to-capital ratio may slightly impact life expectancy before retirement but significantly boosts it after retirement.

Amorim and Franca [18] proposed and tested a model of retirement satisfaction focusing on available time and resources. Their study suggested that individual resources mediate the relationship between retirement planning and satisfaction, emphasizing the importance of developing individual resources related to health, finances, and relationships for overall well-being during retirement planning.

Bordia et al. [1] conducted an in-depth qualitative study exploring the pre-retirement identity profiles based on their work and non-work identities. Subsequently, the study investigated how these identities influence the retirement transition process. The findings suggest that pre-retirement identities can possess advantages and disadvantages during the transition to retirement. While some retirees seamlessly adjust to new identities and relinquish their former ones, others experience inertia and delay the transition until identity crises necessitate adaptation.

Nivalainen [19] employed Feldman and Beehr's three-stage model to investigate the retirement decision-making process. The study aimed to determine how retirement thoughts evolve into plans and eventually into actual retirement. The findings indicated that retirement thoughts significantly influence retirement plans, which vary based on the individual's anticipated retirement age. Additionally, it revealed that retirement plans distinctly influence retirement patterns.

Grip et al. [20] examined the correlation between education and expected retirement age, focusing on sustainable employment for older workers. Drawing upon the social exchange theory, they posited that the impact of educational opportunities on expected retirement age depends on the positive reciprocity of employees. An analysis of matched employer-employee data from 880 employees and 284 employers reveals that educational opportunities are more closely tied to the expected retirement age than to actual participation in educational programs, particularly among employees who believe in positive mutual interaction. Additionally, the study revealed that this interaction effect is amplified in financially healthy organizations.

Kesavayuth et al. [21] explored the extent to which individuals anticipate and adapt to retirement over time, focusing on retirement age as an exogenous factor. Their findings indicate that retirement leads to an increase in leisure satisfaction up to two years prior to retirement. Post-retirement, individuals reported greater satisfaction with both their income and leisure time. These results provide empirical evidence of the causal relationship between retirement and well-being, highlighting a three-stage process that occurs before, during, and after retirement.

Principi et al. [22] conducted a study examining the relationship between retirement satisfaction and planning using a dynamic resource theory approach. The study included 41 individuals from England, 40 from Italy, and 30 from the United States. The findings revealed that realizing retirement plans was positively associated with retirement satisfaction. Additionally, retirement satisfaction was linked to social integration, acceptance of new social roles, and opportunities for active in private and public spheres, such as volunteering or participating in leisure activities. Notably, regardless of retirement planning, the quality of family relationships emerged as a crucial predictor of retirement satisfaction or dissatisfaction.

Lu and Shelley [2] conducted a study exploring the correlation between retirement, public and private pensions, and depressive symptoms in adults. Their research examined differences across countries and age groups, analyzing data from China, England, Mexico, and the United States from 2012-2013. Vickerstaff and Van [23] investigated how older workers utilize internalized age norms and perceptions to inform their decisions regarding extending their working life or retiring. The study involved semi-structured interviews with 104 employees, 52 managers, and occupational health professionals from four organizations in the UK. The results showed that respondents commonly believed that older age is associated with poorer health, which can serve as an incentive for individuals to retire early and maximize the enjoyment of their remaining years in good health. However, some individuals were motivated to continue working to avoid health problems that may arise from an inactive retirement.

Kalenkoski and McCarty [24] conducted a study to examine the factors that influence gradual retirement, defined as transitioning from full-time to part-time employment. The study found that older individuals, black individuals, and those with higher non-labour income were more likely to retire gradually or completely. Conversely, married individuals, college graduates, and those in good health were less likely to retire gradually or completely.

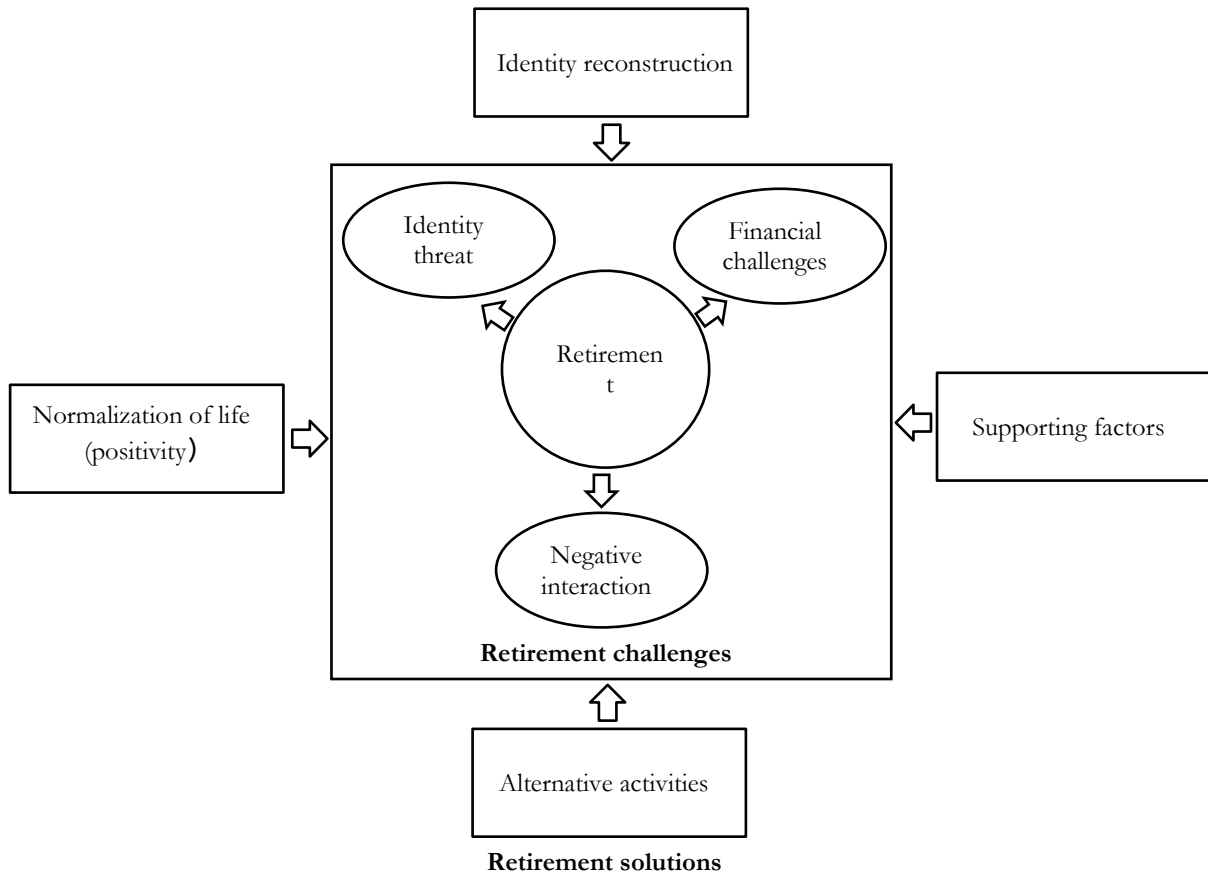
Henning et al. [25] investigated the correlation between pre-retirement work motivation and retirement adjustment in the context of health, aging, and retirement transitions in Sweden. Retirement adjustment was defined as fulfilling three fundamental psychological needs: autonomy, competence, and operational communication. The findings indicated that the relationship between pre-retirement work motivation and retirement adjustment varied based on the subdimension of motivation (intrinsic, identified, extrinsic, or motivation), type of retirement transition (full vs. partial), and specific need (autonomy, competence, or operational communication).

Nakhaeinejad et al. [26] analyze the impact of retirement and propose solutions to help individuals adjust to new retirement conditions. They compare perspectives across different genders, organizational positions, and service records. Froidevaux et al. [27] examine theories on types of resources, their relative importance, and combinations in retirement settings, exploring how these factors influence successful retirement adaptation. They identify four key resource types: social interactions, life conditions, time management, and individuality. The researchers present a model demonstrating how resources impact successful retirement adjustment through signalling, conservation, and acquisition processes.

The current research delves into the issue of retirement compatibility, which varies significantly across different countries. Due to the sensitivity surrounding this issue, this study aims to identify factors contributing to retirement challenges and explore potential solutions for adapting to retirement. The study comprehensively outlines the dimensions and sub-dimensions related to the challenges and solutions of retirement adjustment and employs statistical analysis to examine various perspectives. A distinctive feature of this study is the use of Shannon's Entropy and TOPSIS techniques to rank retirement adaptation solutions. This approach provides valuable insights into the most effective solutions for addressing the challenges associated with retirement.

### 3 | Method

This paper aims to identify indicators for retirement adjustment for personnel in the YEDC. Criteria were derived from existing literature to focus on "challenges" and "solutions" based on the study's conceptual framework (*Fig. 1*) [26]. These indicators were then refined through case studies and consultations with experts from the YEDC. Questionnaires were developed, and a survey was conducted through interviews and online surveys posted on the company's website. To ensure a diverse sample, retired participants of both genders with varying ages, work experience, and organizational positions were selected. Ultimately, 78 questionnaires were approved for further research among those who completed the questionnaires.

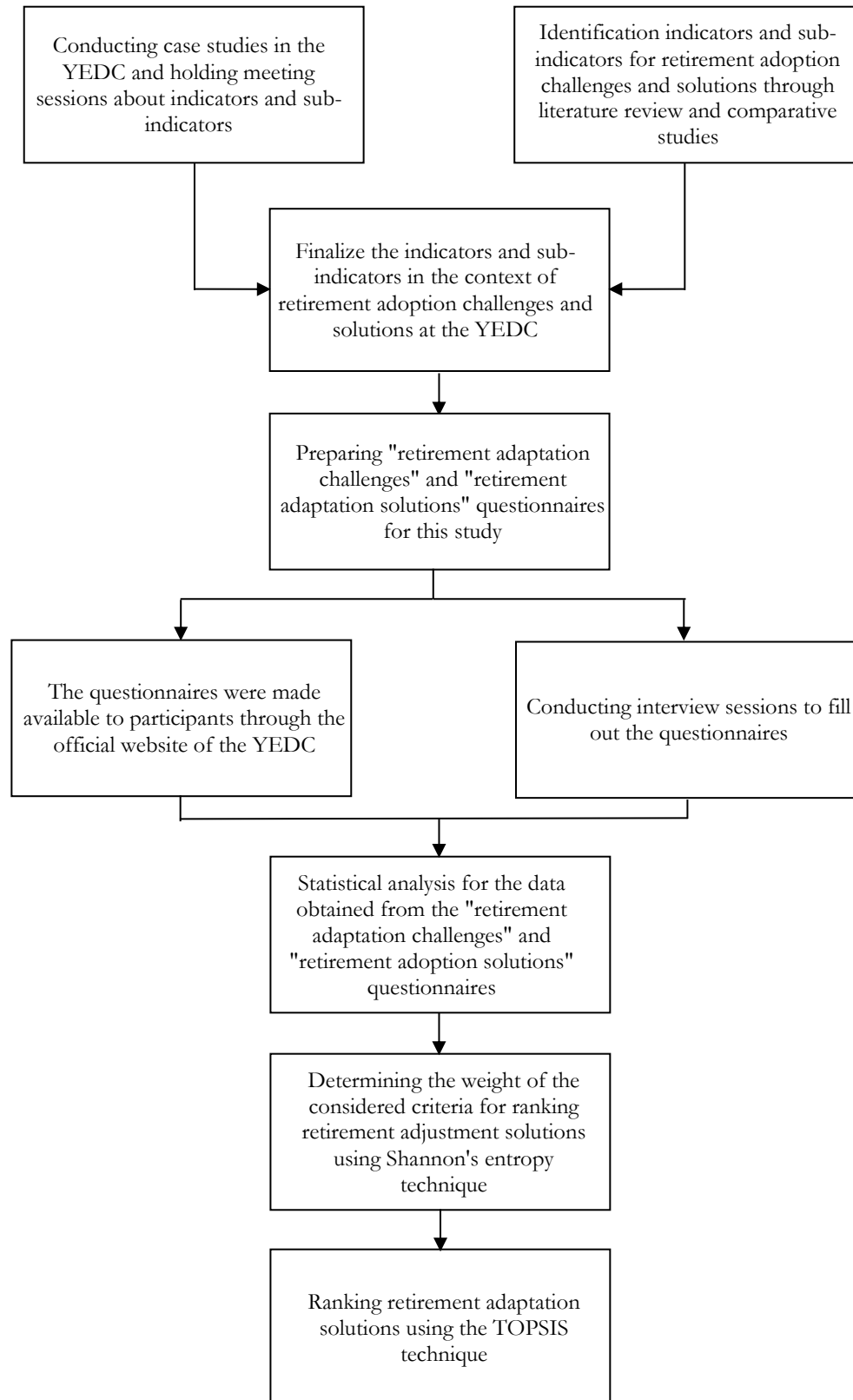


**Fig. 1. Conceptual framework of retirement adjustment.**

The validity and reliability of the research were ensured through continuous observation, long-term involvement in the case study, allocating sufficient time to analyze data in detail, and verifying the findings' confirmability with colleagues and participants. Following the survey conducted through the questionnaires designed for YEDC, statistical analysis was performed on the collected data. This analysis included examining descriptive statistics and exploring differences in perspectives. Statistical analyses such as one-sample t-test, independent t-test, and ANOVA were crucial in examining indicators related to challenges and solutions.

Retirement adjustment solutions were ranked using Shannon's Entropy and TOPSIS techniques, a novel approach in the field. The Shannon's Entropy technique was employed to assess the significance of each criterion, while the TOPSIS method ranked the solutions for retirement adjustment for employees at YEDC. This ranking system allows for efficient allocation of resources and time based on the level of importance of each indicator. *Fig. 2* provides a summary of the steps outlined in this paper.





**Fig. 2. Research flowchart.**

The Entropy method is a multi-criteria decision-making technique utilized to ascertain the weight of criteria. This method provides an advantage in that it computes the degree of importance of indicators based on the decision matrix and data dispersion. The process involves calculating the mathematical expectation ( $E_j$ ) for each index using *Eq. (1)* [28].

$$E_j = \frac{-1}{\text{Lnm}} \times \sum_{i=1}^m [P_{ij} \times \text{Ln}P_{ij}]; j = 1, 2, \dots, n. \quad (1)$$

Here,  $P_{ij}$  represents the normalized score of the  $i$ th alternative relative to the  $j$ th criterion. *Eq. (2)* is utilized to calculate the distance parameter for each criterion.

$$d_j = 1 - E_j; j = 1, 2, \dots, n. \quad (2)$$

Finally, the weight of each criterion ( $w_j$ ) is calculated using *Eq. (3)*.

$$W_j = \frac{d_j}{\sum_{j=1}^n d_j}; j = 1, 2, \dots, n. \quad (3)$$

The TOPSIS method serves as a multi-criteria decision-making framework that aids in ranking alternatives based on their proximity to the positive ideal solution and the distance from the negative ideal solution. The decision-making matrix is normalized using *Eq. (4)* [28].

$$P_{ij} = \frac{r_{ij}}{\sum_{j=1}^n r_{ij}}; i = 1, 2, \dots, m; j = 1, 2, \dots, n. \quad (4)$$

Where  $r_{ij}$  is the score of alternative  $i$  in criteria  $j$ . Then, the weight matrix ( $V$ ) is calculated using *Eq. (5)*.

$$V_{ij} = w_j \times P_{ij}; i = 1, 2, \dots, m; j = 1, 2, \dots, n. \quad (5)$$

In *Eq. (5)*,  $w_j$  is the weight of each criterion obtained from *Eq. (3)*. In the next step, the values of the positive ideal ( $A^+$ ) and negative ideal ( $A^-$ ) are determined by *Eqs. (6)* and *(7)*.

$$A^+ = \{V_1^+, V_2^+, \dots, V_n^+\} = \{(\max_i v_{ij} | j \in J^+), (\min_i v_{ij} | j \in J^-) | i = 1, 2, \dots, m\}. \quad (6)$$

$$A^- = \{V_1^-, V_2^-, \dots, V_n^-\} = \{(\min_i v_{ij} | j \in J^+), (\max_i v_{ij} | j \in J^-) | i = 1, 2, \dots, m\}. \quad (7)$$

The terms  $V_{j+}$  and  $V_{j-}$  refer to the positive ideal and negative, respectively, for the  $j$ th index. In the subsequent step, we calculate the distance of the alternatives from positive and negative ideal solution values using *Eqs. (8)* and *(9)*.

$$d_i^+ = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^+)^2}; i = 1, 2, \dots, m. \quad (8)$$

$$d_i^- = \sqrt{\sum_{j=1}^n (V_{ij} - V_j^-)^2}; i = 1, 2, \dots, m. \quad (9)$$

Ultimately a closeness rating to the ideal is obtained using *Eq. (10)*.

$$CL_i = \frac{d_i^-}{d_i^+ + d_i^-}; i = 1, 2, \dots, m; 0 \leq CL_i \leq 1. \quad (10)$$

*Eq. (10)* reveals that the value of  $CL_i$  falls between zero and one.  $CL_i$  equals one for the positive ideal, where  $d_i^+ = 0$ , and it equals zero for the negative ideal, where  $d_i^- = 0$ . Consequently, the closer the value of  $CL_i$  is to one, the nearer the solution is to the positive ideal solution, thereby making it a more favorable alternative. Essentially, *Eq. (10)* functions as the index for ranking the alternatives and identifying the best choice. Specifically, the alternatives are ranked by arranging the  $CL_i$  values, computed using *Eq. (10)*, in decreasing order. Thus, a higher  $CL_i$ , corresponds to a higher its rank.

## 4 | Findings

This section presents research findings organized into three parts. Firstly, it thoroughly presents dimensions and sub-dimensions related to the "challenges" and "solutions" of retirement adjustment. Secondly, a



statistical analysis of the questionnaires was conducted to explore various perspectives. Lastly, the ranking of retirement adaptation solutions based on Shannon's Entropy and TOPSIS technique is provided.

#### 4.1 | Identifying the Indicators and Sub-Indicators of Challenges and Solutions for Retirement Adjustment

To ensure a smooth transition into retirement for YEDC personnel, identifying challenges they may face is crucial to develop effective solutions. This research examines issues encountered by retirees as outlined in *Table 1*, categorizing them into dimensions and sub-dimensions. Understanding these factors sheds light on why some employees continue working despite being eligible for retirement.

**Table 1. Factors and sub-factors of retirement challenges.**

Factors	Sub-Factors
Financial challenges	Q <sub>1</sub> : reduction in salary and benefits received
	Q <sub>2</sub> : family economic problems and financial difficulties
	Q <sub>3</sub> : failure to increase pensions according to annual inflation
	Q <sub>4</sub> : stop receiving benefits
	Q <sub>5</sub> : uncertainty regarding future housing provision
	Q <sub>6</sub> : increasing treatment costs
Identity threat	Q <sub>7</sub> : feeling of inadequacy
	Q <sub>8</sub> : shock and disbelief
	Q <sub>9</sub> : uncertainties of conditions after retirement
	Q <sub>10</sub> : reduced social status
Negative interactions	Q <sub>11</sub> : reduced communication
	Q <sub>12</sub> : underestimation of experience and skills
	Q <sub>13</sub> : feeling of being forgotten or ignored
	Q <sub>14</sub> : a sense of decreased health or disability

Addressing the retirement challenges outlined in *Table 1* requires effective solutions for successful retirement adaptation. *Table 2* presents solutions organized into four classes with respective sub-classes: identity reconstruction, supporting factors, normalization of life (positivity), and alternative activities to address financial challenges, identity threats, and negative interactions faced by retirees. Implementing these solutions can help retirees navigate challenges for a more positive experience.

**Table 2. Factors and sub-factors of retirement adjustment solutions.**

Factors	Sub-Factors
Identity reconstruction	Q <sub>1</sub> : developing problem-solving skills
	Q <sub>2</sub> : exploring new opportunities (e.g., spending time with family, personal growth)
	Q <sub>3</sub> : professional (skill) training during employment for use in retirement
	Q <sub>4</sub> : not giving important organizational posts in the last years of service
	Q <sub>5</sub> : applying retirees' experiences and knowledge during retirement
	Q <sub>6</sub> : effective savings and investment management before retirement
	Q <sub>7</sub> : participation in public affairs and social activities
Supporting factors	Q <sub>8</sub> : providing advice and support for new activities
	Q <sub>9</sub> : implementing health programs for retirees
	Q <sub>10</sub> : improving medical services
	Q <sub>11</sub> : increasing amenities for retirees
	Q <sub>12</sub> : supporting funds for retirees
	Q <sub>13</sub> : holding gatherings of retirees
	Q <sub>14</sub> : establishing pension organizations
	Q <sub>15</sub> : equalizing insurance facilities and suitable insurance coverage for retirees
	Q <sub>16</sub> : providing suitable housing facilities for retirees
Normalization of life (positivity)	Q <sub>17</sub> : gradual retirement (reducing working hours in the last years of employment)
	Q <sub>18</sub> : pre-retirement counselling
	Q <sub>19</sub> : conducting motivational courses before retirement
	Q <sub>20</sub> : addressing retirees' concerns in post-retirement consultations

Table 2. Continued.

Factors	Sub-Factors
Alternative activities	Q <sub>21</sub> : increasing social interactions
	Q <sub>22</sub> : participating in recreational, sports, religious, study, travel, and other activities
	Q <sub>23</sub> : employment and providing a new source of income
	Q <sub>24</sub> : conclusion of consulting contracts with retirees

The indicators presented in *Table 1* and *Table 2* were initially sourced from relevant literature and subsequently refined through discussions with YEDC personal, following the research methodology outlined in *Fig. 1*.

## 4.2 | Analyzing Descriptive Statistics of Questionnaires

An analysis of the descriptive statistics gathered from questionnaires is presented here to ensure diverse respondent representation across genders (women and men), job levels (Level 1: manager, head of a department, Level 2: responsible expert, expert, and Level 3: technician, expert assistant, and labourer), and work experience (retired, near retired, currently employed). *Table 3* shows participant distribution among these groups.

Table 3: Frequency distribution of respondents.

	Women	Men	Different Job Levels			Work Experience		
			Level 1	Level 2	Level 3	Retired	Near to be Retired	Currently Employed
Frequency	16	62	25	35	18	37	31	11
Percent	20.5	79.5	32.1	44.9	23.1	46.8	39.2	13.9

## 4.3 | Statistical Analysis of "Retirement Challenges" Questionnaire

This section presents the statistical analysis of the retirement challenges questionnaire derived from literature indicators localized through meetings with YEDC experts. Ensuring questionnaire reliability and validity is crucial for accurate data collection. The validity was confirmed based on the opinions of YEDC personnel involved in the research team. Dimensions and sub-dimensions were determined through consensus and expert opinions obtained during multiple meetings to validate the questionnaire according to experts' views.

In this study, Cronbach's alpha coefficient was employed to evaluate the reliability of the questionnaire. A Cronbach's alpha value exceeding 0.7 indicates good reliability, with the "retirement challenges" questionnaire achieving a score of 0.817, reflecting high reliability.

### 4.3.1 | Importance of retirement challenges questionnaire dimensions through one-sample t-test analysis

The importance of the dimensions of the retirement challenges questionnaire was assessed using a one-sample t-test analysis. The test aimed to determine if average scores surpassed a predetermined threshold. The hypothesis test and its corresponding results are presented in *Table 4*.

$$H_0 : \mu \geq 3.$$

$$H_1 : \mu < 3.$$

Table 4. One-Sample t-test analyzing the dimensions of the "Challenges of adapting to retirement" questionnaire.

Research Hypotheses	t	Mean	Significant Value	95% Confidence Interval of the Difference	
				Lower	Upper
Financial challenges	4.152	0.41880	0.001<	0.2180	0.6196
Identity threat	0.176	0.02051	0.861	-0.2119	0.2529
Negative interactions	0.490	0.05128	0.626	-0.1571	0.2597

Results indicated that "financial challenges" were significant ( $p < 0.001$ ), suggesting it is a primary concern for retirees. Additionally,  $t$  is more significant than 1.96, and the upper and lower limits of the confidence interval

are positive, confirming the test claim. Therefore, it can be concluded that "financial challenges" are a significant challenge for retirees. However, both "identity threat" and "negative interactions" did not show clear significance at the 0.05 error level. These two dimensions are still considered essential retirement challenges, but they rank lower in priority than Financial Challenges.

#### 4.3.2| Analyzing gender job level, and experience-based disparities in the dimensions of the retirement challenges questionnaire

In this section, the independent t-test is utilized to explore significant differences in the people's opinions on issues raised in the retirement challenges questionnaire. The assumption test is outlined as follows:

$$H_0 : \mu_1 = \mu_2.$$

$$H_1 : \mu_1 \neq \mu_2.$$

Table 5 reveals that the average response of women to the retirement challenges questionnaire is 3.1920, which is slightly lower than men's average response of 3.1993. An independent t-test was conducted to assess the significance of this difference.

**Table 5. a. Independent t-test examining gender disparities in perceptions of retirement adaptation challenges.**

Gender	The Number of Samples	Mean	Std. Deviation	Std. Error Mean
Women	16	3.1920	0.67447	0.16862
Men	62	3.1993	0.66217	0.08410

**Table 5. b. Independent t-test examining gender disparities in perceptions of retirement adaptation challenges.**

	F	Sig.	t	Mean	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Trust equal variances assumed	0.11	0.917	-0.039	-0.00734	0.969	0.37852-	0.36383
Equal variances not assumed			-0.039	0.00734	0.969	0.3907-	0.38240

As indicated in Table 5.b, with a significance value of 0.917 exceeding the 5%, error level, the assumption of equal variances cannot be rejected. Therefore, to assess the difference, we rely on the data related to unequal variances (second row). Table 5 presents a significant value of 0.969.b, surpassing the 5% test error level. Moreover, the calculated t statistic at -0.039 is lower than the critical value of -1.96. Hence, there is no basis for rejecting the null hypothesis. In summary, at a of 95% confidence level, we can conclude that there is no significant difference between the responses of male and female personnel regarding the retirement challenges questionnaire.

Table 6 examines potential differences in opinions across various "job levels" and also "work experience" within the YEDC personnel regarding each dimension outlined in the "retirement adjustment challenges" questionnaire using an independent ANOVA Test structure. The study employs a hypothetical test, which is structured as follows:

$$H_0 : \mu_1 = \mu_2 = \mu_3.$$

$$H_1 : \mu_1 \neq \mu_2 \neq \mu_3.$$

**Table 6. Differences in perceptions of retirement adoption challenges at different "job levels" and "work experience" using independent ANOVA Test.**

Job Levels		Sum of Squares	df	Mean Square	F	Sig.
Financial challenges	Between groups	3.690	2	1.845	2.411	0.097
	Within groups	57.407	75	0.765		
	Total	61.097	77			
Identity threat	Between groups	1.973	2	0.987	0.927	0.400
	Within groups	79.834	75	1.064		
	Total	81.807	77			
Negative interactions	Between groups	1.800	2	0.900	1.055	0.353
	Within groups	63.995	75	0.853		
	Total	65.795	77			
Financial challenges	Between groups	1.688	2	0.844	1.066	0.35
	Within groups	59.409	75	0.792		
	Total	61.097	77			
Identity threat	Between groups	6.041	2	3.020	2.990	0.056
	Within groups	75.766	75	1.010		
	Total	81.807	77			
Negative interactions	Between groups	4.731	2	2.365	2.905	0.061
	Within groups	61.064	75	0.814		
	Total	65.795	77			

As shown in *Table 6*, all three dimensions outlined in the "retirement challenges" questionnaire for "job level" and "work experience" exhibit significant values that surpass the error level, indicating no grounds for rejecting the null hypothesis. Furthermore, Fisher's statistic falls below the critical value of  $F_{0.05}$ , reinforcing the absence of a basis for rejecting the null hypothesis. Consequently, there is no notable difference in perspectives among individuals at various job levels within YEDC concerning the three dimensions raised in the "retirement challenges" questionnaire.

#### 4.4 | Statistical Analysis of Retirement Adjustment Solutions Questionnaire

The next focus of this study is the statistical analysis of the "retirement adaptation solutions" questionnaire, which proposes solutions aimed at addressing the challenges identified in the "retirement adaptation challenges" questionnaire. These solutions were formulated based on insights from YEDC experts who actively participated in the research team through multiple meetings.

The method employed to ascertain the validity and reliability of the "retirement adaptation solutions" questionnaire in this research mirrors that used for the "retirement adaptation challenges" questionnaire. Validity was affirmed through expert opinions from YEDC, while reliability was assessed using Cronbach's alpha. The calculated Cronbach's alpha value of 0.957 indicates high reliability in the "retirement adaptation solutions" questionnaire.

##### 4.4.1 | Significance of retirement adaptation solutions questionnaire dimensions through one-sample t-test analysis

To evaluate the relevance of the dimensions outlined in the "retirement adaptation solutions" questionnaire from the perspective of YEDC personnel, a one-sample t-test was used. This statistical test aimed to determine if the average scores of the questionnaire respondents were higher than a predefined value, often the mean score. The hypothesis test considered is as follows, and the analysis results for this hypothesis test are in *Table 7*.

To assess the relevance of the dimensions outlined in the "retirement adaptation solutions" questionnaire from the perspective of YEDC personnel, we conducted a one-sample t-test. This statistical analysis aimed to determine if the average scores of the questionnaire respondents were significantly higher than a

predetermined value, typically the mean score. The hypothesis tested is presented below, and the results are summarized in *Table 7*.

$$H_0 : \mu \geq 3.$$

$$H_1 : \mu < 3.$$

**Table 7. One-Sample t-test analyzing the dimensions of the "retirement adaptation solutions" questionnaire.**

Research Hypotheses	t	Mean	Significant Value	95% Confidence Interval	
				Lower	Upper
Identity reconstruction	4.755	0.38095	0.001<	0.2214	0.5405
Supporting factors	5.687	0.59259	0.001<	0.3851	0.8001
Normalization of life (positivity)	4.364	0.43590	0.001<	0.2370	0.6348
Alternative activities	4.790	0.50641	0.001<	0.2959	0.7169

The analysis of the "retirement adaptation solutions" questionnaire indicated that all four dimensions proposed were considered suitable and effective by YEDC personnel. A significant p-value of less than 0.001 was observed across all dimensions, indicating strong statistical significance.

The t-values for all four dimensions exceeded 1.96, further reinforcing their significance. Additionally, the confidence intervals for all dimensions were calculated to be greater than zero, suggesting their positive impact on helping personnel adapt to retirement. Consequently, it can be concluded that all four dimensions within the questionnaire were considered appropriate and effective by YEDC personnel.

#### 4.4.2 | Analyzing gender job level and experience-based disparities in the dimensions of the retirement adaptation solutions questionnaire

An independent t-test was conducted to determine if there were significant opinions differences between men and women. *Table 8* displays that women's average opinion on the questionnaire items is 3.7318, while men's average is 3.4281. The independent t-test was conducted to ascertain whether this difference in means is statistically significant.

**Table 8. a. Independent t-test examining gender disparities in perceptions of retirement adaptation solutions.**

Gender	The Number of Samples	Mean	Std. Deviation	Std. Error Mean
Women	16	3.7318	0.71992	0.17998
Men	62	3.4281	0.80492	0.10222

**Table 8. b. Independent t-test examining gender disparities in perceptions of retirement adaptation solutions.**

	F	Sig.	t	Mean	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Trust Equal variances assumed	1.656	0.202	1.373	0.30368	0.174	0.13689-	0.74425
Equal variances not assumed			1.467	0.30368	0.155	0.12212-	0.72948

*Table 8.b* showed that the significance value of 0.202 exceeded the 5% test error level, indicating that the assumption of equality of variances could not be upheld. Therefore, data from the assumption of inequality of variances (second line) was used. With a significance value of 0.155, which surpasses the 5% test error level and a t-statistic value of 1.467, lower than the critical value of 1.96, there was no justification for rejecting the null hypothesis. Hence, at a confidence level of 95%, there was no significant difference between male and female personnel's opinions on solutions for adapting to retirement.

Table 9 explores potential differences in opinions among different job levels and work experience within the YEDC's personnel regarding each dimension outlined in the "retirement adjustment solutions" questionnaire. The analysis employs a hypothetical test structured as follows:

$$H_0 : \mu_1 = \mu_2 = \mu_3.$$

$$H_1 : \mu_1 \neq \mu_2 \neq \mu_3.$$

**Table 9. Differences in perceptions of retirement adaptation solutions at different job levels and work experience using independent ANOVA Test.**

Job Levels		Sum of Squares	df	Mean Square	F	Sig.
Identity reconstruction	Between groups	7.004	2	3.502	8.323	0.001<
	Within groups	31.554	75	0.421		
	Total	38.558	77			
Supporting factors	Between groups	9.511	2	4.756	6.405	0.003
	Within groups	55.690	75	0.743		
	Total	65.202	77			
Normalization of life (positivity)	Between groups	5.143	2	2.572	3.520	0.035
	Within groups	54.786	75	0.730		
	Total	59.929	77			
Alternative activities	Between groups	9.366	2	4.683	6.081	0.004
	Within groups	57.756	75	0.770		
	Total	67.122	77			
Work experiences		Sum of Squares	df	Mean Square	F	Sig.
Identity reconstruction	Between groups	6.629	2	3.314	7.785	0.001<
	Within groups	31.929	75	0.426		
	Total	38.558	77			
Supporting factors	Between groups	8.152	2	4.076	5.359	0.007
	Within groups	57.050	75	0.761		
	Total	65.202	77			
Normalization of life (positivity)	Between groups	2.425	2	1.212	1.581	0.212
	Within groups	57.505	75	0.767		
	Total	59.929	77			
Alternative activities	Between groups	6.356	2	3.178	3.922	0.024
	Within groups	60.766	75	0.810		
	Total	67.122	77			

Table 9 shows no statistically significant differences in opinions among personnel at different "job levels" regarding the four dimensions covered in the "retirement adjustment solutions" questionnaire, as the variance falls below the error level. However, when examining individuals with varying levels of work experience, it a significant divergence in perspectives emerges regarding the dimensions of "identity reconstruction", "supporting factors", and "alternative activities". This is evidenced by a smaller error level and Fisher's statistic exceeding the critical value of F0.05, resulting in the rejection of the null hypothesis for these three dimensions. Thus, a notable disparity in views exists among individuals with different levels of work experience at YEDC concerning "identity reconstruction", "supporting factors", and "alternative activities". In contrast, for the dimension of "normalization of life (positivity)," the significance value of 0.212 exceeds the error level of 0.05, and Fisher's statistic is lower than the critical value of F0.05. Consequently, there is no basis to reject the null hypothesis, indicating no significant difference in perspectives among individuals with varying levels of work experience in this dimension.

## 4.5 | Ranking of Retirement Adaption Solutions

This section presents the ranking of retirement adjustment solutions using Shannon's entropy and TOPSIS techniques. *Table 10* serves as the decision matrix for this analysis, where the alternatives being solutions for retirement adjustment, and the criteria for ranking include "financing", "identity improvement", and "interactions improvement". These criteria align with the dimensions outlined in the "retirement adjustment challenges" questionnaire. A solution that effectively addresses financial concerns, enhances identity, and improves interactions is regarded as a suitable option for retirement adjustment. The numbers in *Table 10* represent the average opinions of respondents regarding each solution.

**Table 10. Average respondent opinions on retirement adaptation solutions across financial, identity, and interaction Criteria (Decision Matrix)**

Dimensions	Sub-Dimensions	Financing	Identity Improvement	Interactions Improvement
Identity reconstruction	Q <sub>1</sub>	3.8235	3.7255	3.7647
	Q <sub>2</sub>	3.3137	3.7451	4
	Q <sub>3</sub>	4.2941	4.0392	4.0588
	Q <sub>4</sub>	1.8628	2.1765	2.2353
	Q <sub>5</sub>	3.4902	3.9216	3.9804
	Q <sub>6</sub>	4.4118	3.5098	3.3529
	Q <sub>7</sub>	2.5686	3.9804	4
Supporting factors	Q <sub>8</sub>	3.6863	3.6863	3.7255
	Q <sub>9</sub>	3.6078	3.7843	3.8235
	Q <sub>10</sub>	4.1765	3.4902	3.4706
	Q <sub>11</sub>	4.1177	3.6667	3.5686
	Q <sub>12</sub>	4.0392	3.2941	3.3726
	Q <sub>13</sub>	2.4902	3.9020	4.1177
	Q <sub>14</sub>	3.1569	3.8431	3.9608
	Q <sub>15</sub>	4.2745	3.3529	3.2157
Normalization of life (positivity)	Q <sub>16</sub>	4.0784	2.9803	2.8431
	Q <sub>17</sub>	2.8431	3.0196	2.9412
	Q <sub>18</sub>	3.3922	3.7255	3.5882
	Q <sub>19</sub>	2.7451	3.5882	3.4510
Alternative activities	Q <sub>20</sub>	3.4118	3.7843	3.7255
	Q <sub>21</sub>	3.0392	3.8628	4.0980
	Q <sub>22</sub>	2.6078	4.098	4.2745
	Q <sub>23</sub>	4.3922	3.9608	3.8824
	Q <sub>24</sub>	3.9608	3.8628	3.8628

To determine the priority (weight) of the criteria (financing, identity improvement, and interaction improvement), Shannon's entropy technique was utilized. The calculations for this method are summarized in *Table 11*, which includes values for  $E_j$ ,  $d_j$ , and the weight ( $W_j$ ) are derived from *Eqs. (1)-(3)*.

**Table 11. Computation of criteria weight using Shannon's entropy technique.**

	Financing	Identity Improvement	Interactions Improvement
$E_j$	0.9377	0.9417	0.9412
$d_j$	0.06231	0.05833	0.05878
$W_j$	0.35	0.32	0.33

Analysis of *Table 11* indicates that financing criterion holds the highest priority with a weight of 0.35, followed closely by interaction improvement at 0.33, and finally, identity improvement securing third place with a weight of 0.32. These weights informed the matrix in *Table 12* computed through *Eqs. (4) and (5)*.



**Table 12. Weighted matrix for ranking retirement adjustment solutions.**

Dimension	Sub-Dimension	Financing	Identity Improvement	Interactions Improvement
Identity reconstruction	Q <sub>1</sub>	0.0158	0.0139	0.0141
	Q <sub>2</sub>	0.0137	0.0140	0.0150
	Q <sub>3</sub>	0.0178	0.0151	0.0152
	Q <sub>4</sub>	0.0077	0.0081	0.0084
	Q <sub>5</sub>	0.0145	0.0147	0.0149
	Q <sub>6</sub>	0.0183	0.0131	0.0126
Supporting factors	Q <sub>7</sub>	0.0106	0.0149	0.0150
	Q <sub>8</sub>	0.0153	0.0138	0.0140
	Q <sub>9</sub>	0.0150	0.0141	0.0144
	Q <sub>10</sub>	0.0173	0.0130	0.0130
	Q <sub>11</sub>	0.0171	0.0137	0.0133
	Q <sub>12</sub>	0.0167	0.0123	0.0127
Supporting factors	Q <sub>13</sub>	0.0103	0.0146	0.0155
	Q <sub>14</sub>	0.0131	0.0144	0.0149
	Q <sub>15</sub>	0.0177	0.0125	0.0121
	Q <sub>16</sub>	0.0169	0.0111	0.0107
Normalization of life (positivity)	Q <sub>17</sub>	0.0118	0.0113	0.0110
	Q <sub>18</sub>	0.0141	0.0139	0.0135
	Q <sub>19</sub>	0.0114	0.0134	0.0130
	Q <sub>20</sub>	0.0141	0.0141	0.0140
Alternative activities	Q <sub>21</sub>	0.0126	0.0144	0.0154
	Q <sub>22</sub>	0.0108	0.0153	0.0160
	Q <sub>23</sub>	0.0182	0.0148	0.0146
	Q <sub>24</sub>	0.0164	0.0144	0.0145

Subsequently, positive and negative ideals were calculated for each criterion in *Table 13* using *Eqs. (6) and (7)* based on the weighted matrix from *Table 12*.

**Table 13. Positive ideal and negative ideal in criteria.**

	Financing	Identity Improvement	Interactions Improvement
Positive ideal	0.0183	0.0153	0.0160
Negative ideal	0.0077	0.0081	0.0084

Based on the positive and negative ideals calculated in *Table 13*, the distance of each solution from these ideals ( $d_i^+$  and  $d_i^-$ ) was determined using *Eqs. (8) and (9)*, as shown in *Table 14*. The  $CL_i$  value was derived from *Eq. (10)* in the  $CL_i$  column of *Table 14* to rank retirement adjustment solutions; higher  $CL_i$  values signify greater priority or rank for a proposed solution, as reflected in the "ranking solutions" column in *Table 14*.

**Table 14. Calculation results for the TOPSIS technique.**

Dimension	Sub-Dimension	$d_i^+$	$d_i^-$	$CL_i$	Ranking Solutions
Identity reconstruction	Q <sub>1</sub>	0.0034	0.0100	0.7457	4
	Q <sub>2</sub>	0.0049	0.0100	0.6725	10
	Q <sub>3</sub>	0.0010	0.0126	0.9287	1
	Q <sub>4</sub>	0.0149	0.0065	0.3046	24
	Q <sub>5</sub>	0.0040	0.0107	0.7254	6
	Q <sub>6</sub>	0.0041	0.0082	0.6669	11
Supporting factors	Q <sub>7</sub>	0.0077	0.0099	0.5629	19
	Q <sub>8</sub>	0.0040	0.0095	0.7062	8
	Q <sub>9</sub>	0.0039	0.0100	0.7184	7
	Q <sub>10</sub>	0.0039	0.0085	0.6857	9
	Q <sub>11</sub>	0.0033	0.0094	0.7390	5
	Q <sub>12</sub>	0.0048	0.0074	0.6070	16
	Q <sub>13</sub>	0.0080	0.0100	0.5558	20
	Q <sub>14</sub>	0.0054	0.0099	0.6465	13
	Q <sub>15</sub>	0.0049	0.0071	0.5935	18
	Q <sub>16</sub>	0.0069	0.0045	0.3929	22

Table 14. Continued.

Dimension	Sub-Dimension	d <sub>I</sub> +	d <sub>I</sub> -	CL <sub>I</sub>	Ranking
Normalization of life (positivity)	Q <sub>17</sub>	0.0091	0.0047	0.3375	23
	Q <sub>18</sub>	0.0051	0.0088	0.6312	15
	Q <sub>19</sub>	0.0078	0.0075	0.4893	21
	Q <sub>20</sub>	0.0048	0.0094	0.6633	12
Alternative activities	Q <sub>21</sub>	0.0058	0.0102	0.6380	14
	Q <sub>22</sub>	0.0075	0.0110	0.5953	17
	Q <sub>23</sub>	0.0016	0.0118	0.8828	2
	Q <sub>24</sub>	0.0026	0.0109	0.8089	3

## 5 | Discussion

This research provides valuable insights into the challenges and solutions related to retirement adjustment, offering practical recommendations for YEDC to enhance retirement compatibility. By implementing these solutions, YEDC can ensure a smooth transition for employees into retirement and maintain a positive relationship with them after they leave the organization.

Statistical analysis validated the questionnaire data, revealing no significant differences in views based on gender, job levels, or work experience across most dimensions. These findings provide valuable insights for YEDC to effectively tackle retirement challenges and implement solutions. The research ranks solutions for retirement adjustment using a methodology combining Shannon's entropy and TOPSIS techniques (*Table 15*).

Table 15. Ranking of retirement adjustment solutions.

Priority	Sub-Dimension	Solutions	Dimension
1	Q <sub>3</sub>	Professional (skill) training during employment for use in retirement	Identity reconstruction
2	Q <sub>23</sub>	Employment and providing a new source of income	Alternative activities
3	Q <sub>24</sub>	Conclusion of consulting contracts with retirees	Alternative activities
4	Q <sub>1</sub>	Developing problem-solving skills	Identity reconstruction
5	Q <sub>11</sub>	Increasing amenities for retirees	Supporting factors
6	Q <sub>5</sub>	Applying retirees' experiences and knowledge during retirement	Identity reconstruction
7	Q <sub>9</sub>	Implementing health programs for retirees	Supporting factors
8	Q <sub>8</sub>	Providing advice and support for new	Supporting factors
9	Q <sub>10</sub>	Improving medical services	Supporting factors
10	Q <sub>2</sub>	Exploring new opportunities (e.g., spending time with family, personal growth)	Identity reconstruction
11	Q <sub>6</sub>	Effective savings and investment management before retirement	Identity reconstruction
12	Q <sub>20</sub>	Addressing retirees' concerns in post-retirement consultations	Normalization of life (positivity)
13	Q <sub>14</sub>	Establishing pension organizations	Supporting factors
14	Q <sub>21</sub>	Increasing social interactions	Alternative activities
15	Q <sub>18</sub>	Pre-retirement counselling	Normalization of life (positivity)
16	Q <sub>12</sub>	Supporting funds for retirees	Supporting factors
17	Q <sub>22</sub>	Participating in recreational, sports, religious, study, travel, and other activities	Alternative activities
18	Q <sub>15</sub>	Equalizing insurance facilities and suitable insurance coverage for retirees	Supporting factors

Table 15. Continued.

Priority	Sub-Dimension	Solutions	Dimension
19	Q <sub>7</sub>	Participation in public affairs and social activities	Identity reconstruction
20	Q <sub>13</sub>	Holding gatherings of retirees	Supporting factors
21	Q <sub>19</sub>	Conducting motivational courses before	Normalization of life
22	Q <sub>16</sub>	Providing suitable housing facilities for	Supporting factors
23	Q <sub>17</sub>	Gradual retirement (reducing working hours in the last years of employment)	Normalization of life (positivity)
24	Q <sub>4</sub>	Not giving important organizational posts in the last years of service	Identity reconstruction

The results in *Table 15* highlight critical solutions that are essential for enhancing retirement compatibility, with "professional (skill) training during employment for use in retirement" identified as the most critical solution, while "not giving important organizational posts in the last years of service" as the least important. Given limited resources, it is crucial to allocate adequate time and resources toward implementing these prioritized solutions.

This study contributes to current understanding of retirement adjustment by framing retirement considerations within the two categories of "Challenges" and "Solutions", thereby enhancing organizational effectiveness in retirement adjustment. The statistical analysis offers diverse perspectives on indicators related to retirement challenges and solutions within organizations, enriching the existing literature for practical application. Moreover, the use of the TOPSIS technique and Shannon's entropy to rank retirement adjustment solutions distinguishes this study from previous research, bolstering the credibility of its results.

## 6 | Conclusion

The study aims to investigate the factors influencing YEDC employees' attachment to work and suggest solutions to ease their transition into retirement. A comprehensive literature review on "Challenges" and "Solutions" related to retirement adjustment was conducted. The dimensions and sub-dimensions of these two subjects were identified through consultations with YEDC staff and tailored to the organization's specific conditions. During the statistical analysis phase, data validity obtained from questionnaires was verified, and reliability calculation confirmed the identified dimensions in both the "retirement adjustment challenges" and "retirement adjustment solutions" questionnaires. Various tests, including the one-sample t-test, confirmed that all dimensions presented in the questionnaires are relevant from the perspective of YEDC personnel.

An independent t-test examined gender-based differences in views on questionnaire dimensions, revealing no significant distinction between women and men. Similarly, an ANOVA test found no significant difference in views based on job levels across both questionnaires.

Regarding work experience, an ANOVA test assessed differences in views on "retirement adjustment challenges", showing no significant variance among personnel. However, notable distinctions were observed among personnel with varying experience levels regarding dimensions such as "identity reconstruction," "supporting factors," and "alternative activities" within the "retirement adjustment solutions" questionnaire. At the same time significant difference was observed in the dimension of "normalizing of life (positivity)".

Furthermore, a ranking of retirement adjustment solutions was conducted using Shannon's entropy and TOPSIS techniques to help YEDC prioritize resource allocation for implementing these solutions efficiently. The solutions are presented in *Table 15* according to their importance. The solution involving "professional (skill) training during employment for use in retirement" received the highest priority, and "not giving important organizational posts in the last years of service" was deemed least necessary among the proposed solutions.

Creating a coherent and scientific framework by integrating TOPSIS and Shannon entropy has validated the ranking of retirement adjustment solutions. Additionally, conducting sensitivity analysis to assess result robustness and integrating expert judgment to fine-tune criteria weights further enhances the credibility of this methodology. However, limitations of the Shannon entropy-TOPSIS approach include susceptibility to extreme values, potential bias in selecting reference alternatives, and the assumption of independence among criteria, which may not always align with real-world decision-making scenarios.

For future research, it would be valuable to explore the enduring impacts of various retirement adjustment solutions on the well-being and satisfaction of retired individuals. Additionally, further exploration could involve alternative methods such as interviews, focus groups and diverse ranking techniques to enhance or reinforce the survey methodology. Moreover, evaluating the effectiveness of suggested solutions in various organizations and even other countries with distinct cultures could offer valuable insights for policymakers and practitioners.

## Acknowledgments

We are deeply grateful for the trust that YEDC has placed upon us to conduct this research on retirement challenges and solutions. The insights derived from this study will undoubtedly assist YEDC in formulating effective solutions to improve the alignment of their personnel with retirement. We also thank to all the participants who took the time to complete the questionnaires and provide their valuable feedback. Their contribution was crucial in ensuring the validity and reliability of the data obtained from this study. Once again, we would like to extend my sincere appreciation to the employees and managers of YEDC for their steadfast support and collaboration throughout this research project.

## Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## Data Availability

The data of this research are available upon request.

## Conflicts of Interest

The author declares that he has no conflict of interest.

## References

- [1] Bordia, P., Read, S., & Bordia, S. (2020). Retiring: role identity processes in retirement transition. *Journal of organizational behavior*, 41(5), 445–460. DOI: 10.1002/job.2438
- [2] Lu, P., & Shelley, M. (2021). Retirement, pensions, and depressive symptoms among older adults in China, England, Mexico, and the United States. *The international journal of aging and human development*, 92(1), 40–64. DOI: 10.1177/0091415019868227
- [3] Yeung, D. Y. (2018). Adjustment to retirement: effects of resource change on physical and psychological well-being. *European journal of ageing*, 15(3), 301–309. DOI: 10.1007/s10433-017-0440-5
- [4] Topa, G., & Pra, I. (2018). Retirement adjustment quality: optimism and self-efficacy as antecedents of resource accumulation. *Applied research in quality of life*, 13, 1015–1035. DOI: 10.1007/s11482-017-9571-2
- [5] Schmälzle, M., Wetzel, M., & Huxhold, O. (2019). Pathways to retirement: are they related to patterns of short and long-term subjective well-being? *Social science research*, 77, 214–229. DOI: 10.1016/j.ssresearch.2018.10.006

- [6] Henkens, K., Van Dalen, H. P., Ekerdt, D. J., Hershey, D. A., Hyde, M., Radl, J., ... Zacher, H. (2018). What we need to know about retirement: pressing issues for the coming decade. *The gerontologist*, 58(5), 805–812. DOI: 10.1093/geront/gnx095
- [7] Bönke, T., Kemptner, D., & Lüthen, H. (2018). Effectiveness of early retirement disincentives: individual welfare, distributional and fiscal implications. *Labour economics*, 51, 25–37. DOI: 10.1016/j.labeco.2017.11.004
- [8] Froidevaux, A., Hirschi, A., & Wang, M. (2018). Identity incongruence and negotiation in the transition from work to retirement: a theoretical model. *Organizational psychology review*, 8(4), 228–255. DOI: 10.1177/2041386619830754
- [9] Hansson, I., Buratti, S., Thorvaldsson, V., Johansson, B., & Berg, A. I. (2018). Changes in life satisfaction in the retirement transition: interaction effects of transition type and individual resources. *Work, aging and retirement*, 4(4), 352–366. DOI: 10.1093/workar/wax025
- [10] Aslim, E. G. (2019). The relationship between health insurance and early retirement: evidence from the affordable care act. *Eastern economic journal*, 45, 112–140. DOI: 10.1057/s41302-018-0115-8
- [11] Boissonneault, M., & de Beer, J. (2018). Work ability trajectories and retirement pathways: a longitudinal analysis of older American workers. *Journal of occupational and environmental medicine*, 60(7), e343–e348. DOI: 10.1097/JOM.0000000000001353
- [12] Isabelle Hansson Sandra Buratti, B. J., & Berg, A. I. (2019). Beyond health and economy: resource interactions in retirement adjustment. *Aging & mental health*, 23(11), 1546–1554. DOI: 10.1080/13607863.2018.1506745
- [13] Záhorcová, L., Halama, P., Škrobáková, Ž., Bintliff, A. V., & Navarová, S. (2021). Qualitative analysis of transition from work to retirement among Slovak retirees. *Current psychology: a journal for diverse perspectives on diverse psychological issues*, 40(4), 1531–1545. DOI: 10.1007/s12144-019-00384-w
- [14] Hurtado, M. D., & Topa, G. (2019). Quality of life and health: influence of preparation for retirement behaviors through the serial mediation of losses and gains. *International journal of environmental research and public health*, 16(9), 1539. DOI: 10.3390/ijerph16091539
- [15] Bairoliya, N. (2019). Pension plan heterogeneity and retirement behavior. *European economic review*, 116, 28–59. DOI: 10.1016/j.euroecorev.2019.03.005
- [16] Hansson, I., Henning, G., Buratti, S., Lindwall, M., Kivi, M., Johansson, B., & Berg, A. I. (2020). The role of personality in retirement adjustment: longitudinal evidence for the effects on life satisfaction. *Journal of personality*, 88(4), 642–658. DOI: 10.1111/jopy.12516
- [17] Chen, S., & Li, G. (2019). Time-inconsistent preferences, retirement, and increasing life expectancy. *Mathematical problems in engineering*, 2019(1), 8681471. DOI: 10.1155/2019/8681471
- [18] Amorim, S. M., & de Freitas Pinho França, L. H. (2022). Health, financial and social resources as mediators to the relationship between planning and satisfaction in retirement. *Current psychology*, 41(6), 3510–3524. DOI: 10.1007/s12144-020-00836-8
- [19] Nivalainen, S. (2022). From plans to action? Retirement thoughts, intentions and actual retirement: an eight-year follow-up in Finland. *Ageing and society*, 42(1), 112–142. DOI: 10.1017/S0144686X20000756
- [20] De Grip, A., Fouarge, D., Montizaan, R., & Schreurs, B. (2020). Train to retain: training opportunities, positive reciprocity, and expected retirement age. *Journal of vocational behavior*, 117, 1–15. DOI: 10.1016/j.jvb.2019.103332
- [21] Dusanee Kesavayuth, R. E. R., & Zikos, V. (2020). The dynamic effects of retirement on well-being. *Applied economics*, 52(54), 5921–5935. DOI: 10.1080/00036846.2020.1781770
- [22] Principi, A., Smeaton, D., Cahill, K., Santini, S., Barnes, H., & Socci, M. (2020). What happens to retirement plans, and does this affect retirement satisfaction? *The international journal of aging and human development*, 90(2), 152–175. DOI: 10.1177/0091415018796627
- [23] Vickerstaff, S., & der Horst, M. (2021). The impact of age stereotypes and age norms on employees' retirement choices: a neglected aspect of research on extended working lives. *Frontiers in sociology*, 6, 686645. DOI: 10.3389/fsoc.2021.686645

- 
- [24] Kalenkoski, C. M., & McCarty, S. H. (2021). In or out or somewhere in between? The determinants of gradual retirement. *Journal of family and economic issues*, 42(2), 387–394. DOI: 10.1007/s10834-020-09734-4
- [25] Henning, G., Stenling, A., Bielak, A. A., Bjälkebring, P., Gow, A. J., Kivi, M., ... & Lindwall, M. (2021). Towards an active and happy retirement? Changes in leisure activity and depressive symptoms during the retirement transition. *Aging & mental health*, 25(4), 621–631. DOI: 10.1080/13607863.2019.1709156
- [26] Nakhaeinejad, M., Jam, A., & Mirajalili, M. M. (2023). Analyzing the effects of retirement and presenting solutions to adapt to them. *Management and development process*, 36(2), 89-122. **(In Persian)**. DOI: 10.52547/jmdp.36.2.3
- [27] Froidevaux, A., Curchod, G., Degli-Antoni, S., Maggiori, C., & Rossier, J. (2024). Happily retired! A consensual qualitative research to elaborate theory on resources' categorization, processes and caravans for successful retirement adjustment. *Journal of occupational and organizational psychology*, 97(2), 699–728. DOI: 10.1111/joop.12489
- [28] Nakhaeinejad, M. (2020). A new method for project ranking based on risk management and multicriteria approach. *European project management journal*, 10(1), 50–63. <https://www.cceol.com/search/article-detail?id=924580>